

CONOAXIMA, A NEW GENUS OF THE HYMENOPTEROUS FAMILY EURYTOMIDÆ, WITH A DESCRIPTION OF ITS LARVA AND PUPA.

BY CHARLES T. BRUES<sup>1</sup>

During the course of his investigations on myrmecophilous plants in British Guiana, Professor I. W. Bailey obtained specimens of a remarkable Hymenopterous insect parasitic on ant-queens.

The following notes on its habits have been furnished by Professor Bailey.

"The colonies of *Azteca constructor* Emery and of *A. alfaro* Emery which inhabit the fistulose stems of *Cecropia angulata* I. W. Bailey, the common myrmecophytic *Cecropia* of the Kartabo Region of British Guiana, are initiated by young fecundated queens in juvenile plants. The queens enter the internodal chambers through circular perforations cut in groove-like depressions (Prostomata) in the sides of the stem. These entrance apertures are covered with triturated pith on their central sides and ultimately become occluded by callus, which seals the queens within the 'primordial chambers.'

"Although many of the successive internodal cavities of each young plant become inhabited, few of the queens succeed in raising a brood. When the stems are cut open, most of the chambers are found to contain dead queens. I was unable to account for this high mortality until I discovered the presence of a small scar in the callus which fills the entrance aperture. This scar within a scar indicated, of course, that some insect had emerged since the queen became sealed within her domatium. Following up this clue, I soon found chambers—with modified callus in the apertures—which contained, in addition to the dead and frequently dismembered queen, the larva, pupa or imago of a Hymenopterous parasite. The evidence at hand seems to indicate that the queens are parasitized before they enter their dwellings."

<sup>1</sup>Contribution from the Entomological Laboratory of the Bussey Institution, Harvard University, No. 209.

The parasite proves to represent an undescribed genus which may be characterized as follows:

**Conoaxima** gen. nov.

Similar to *Axima* Walker. Head strongly transverse, deeply emarginate behind, with an erect spine or tooth in front of each lateral ocellus, cheeks and temples separated from head behind by a strong ridge or carina; ocelli in a curved line, the lateral one close to the eye; antennæ inserted at the middle of the face, 11-jointed, with one ring-joint; front with a deep groove that receives the two antennal scapes; eyes oval, bare, one-third longer than the malar space; anterior orbits divergent below, the head in front not conspicuously narrowed toward the mouth; temples rounded behind the eyes. Pronotum as long as the mesonotum, with a strong, tooth-like or sharply rounded projection medially in front; scapulæ separated behind by half the length of the mesonotum. Scutellum conical, twice as long as the mesonotum, its tip extending well over the propodeum. Abdomen long, compressed, petiole about half the length of the hind femur; fifth segment the longest; sixth and seventh also much lengthened, stigmal and postmarginal veins of equal length, each half as long as the marginal. Head and thorax deeply, coarsely punctate; black.

Type species: *C. aztecicida* sp. nov.

This genus is very similar to *Axima*, but differs in several important characters. The scutellum is conical in form, not rounded, the abdominal petiole is very much shorter and the marginal vein only about twice as long as the stigmal. The spines on the vertex in the two genera are similar, but there is no ridge between them in *Conoaxima*. The large conical scutellum which projects over the propodeum, with its upper surface in the same plane as the mesonotum give the insect the appearance of an *Eucharid*.

In addition to the species taken by Professor Bailey in British Guiana, I have a second one obtained by Professor W. M. Wheeler some years ago at Quirigua, Quatemala, also from a

nest of Azteca. Without doubt, the Central American species is also a parasite of these ants.

The two species may be distinguished as follows:

Frontal projections spiniform, acute, much longer than broad at base; median projection of pronotum acute; scape of antennæ black or piceous; . . . . . *C. aztecicida* sp. nov.

Frontal projections triangular, as high as broad at base; median projection of pronotum rounded; scape of antennæ more or less ferruginous, especially toward base . . *C. affinis* sp. nov.

### **Conoaxima aztecicida** sp. nov.

♀. Length 4.2 mm. Black; abdomen obscurely stained with rufous at the sides of the sixth and base of the seventh segment; antennal scape entirely, pedicel, except above; knees, tibiæ and tarsi of front legs; knees and apices of tibiæ of four posterior legs, yellow; middle and hind tarsi, except tips, white. Body clothed with white, bristly hairs, one arising from each puncture on the thoracic nota, with a denser patch on the metanotum and hind coxa below; tip of abdomen also white haired; legs clothed with white hairs which form quite a distinct fringe on the hind femora beneath. Head closely and densely punctate, each puncture about half as wide as the diameter of the scape and almost everywhere so close together that the space between them forms an irregularly hexagonal reticulum. Lateral ocelli much closer to the eye than to the median ocellus, the lateral ones oval, separated by their own width from the eye; frontal spine just in front and slightly toward the median line from the lateral ocellus; head seen from above two and one half times as broad as thick, with the eyes extending almost to the front and to the temples. Antennal scape extending to the median ocellus, less than half as long as the flagellum; pedicel narrower than, and only half as long as the first funicular joint; one ring-joint; the five funicle joints growing thicker and slightly shorter, first one oval, twice as long as thick, fifth but little longer than thick; club composed of three distinct joints, as long as the two preceding funicular joints together, entire

flagellum clothed with long, sparse white hairs. Pronotum one-third as long as wide, very slightly and broadly emarginate medially behind; punctation like that of the head, forming about seven irregular transverse rows; mesonotum and scutellum sculptured like the pronotum; scapulæ less clearly separated behind where they are separated by about one-fourth the width of the thorax; a very deep transverse impression between the median lobe of mesonotum and the scutellum; the latter sharply upturned at the tip, and with a broad shallow shagreened impression basally at the sides, the centre of the impression with a tuft of white hairs. Propodeum with a large shield-shaped shagreened areola extending from base to apex and a lateral transversely reticulate areola on each side, the carinæ very strong. Pleuræ opaque, almost entirely without large punctures except on the densely hairy metapleuræ; mesopleura with a few oblique lines. Hind coxæ granulate, densely hairy externally. Petiole with a median furrow above and an incomplete lateral one; second to fourth segments short, subequal, together distinctly shorter than the fifth, which is by far the longest segment, sixth and seventh of about equal length, each on the dorsum two-thirds as long as the fifth, the sixth with a small round, very distinct spiracle near the base, the seventh with a larger one toward tip; eighth barely extruded; gaster in profile lanceolate, one-third as high as long, highest at the base of the fifth segment. Wings hyaline, venation pale; rather densely hairy, but without noticeably marginal fringe; hind wing with three frenulum hooks.

Type from Kartabo, British Guiana (I. W. Bailey, collected as described on a previous page of this journal (*Psyche*, vol. 29, p. 153).

### *Conoaxima affinis* sp. nov.

♀. Length 3.7 mm. Very similar to *C. aztecicida*, but differing most distinctly as indicated in the table above. The thorax is also more coarsely punctate, especially the scutellum where about eight punctures form a longitudinal line.

Type from Quirigua, Guatemala, January 14, 1912. (W. M. Wheeler). This species undoubtedly attacks *Azteca* also, as Professor Wheeler took the specimen from the hollow thorn of an *Acacia* when collecting nests of *Azteca* at a place where these ants were abundant.

The anatomical similarities between *Conoaxima* and *Axima* are interesting on account of the habits of the two genera. The first account of the habits of *Axima* was given by Howard<sup>1</sup> who cites a number of instances in which *Axima zabriskei* Howard has been reared from small bees under conditions that allow of little doubt that the *Axima* is a primary parasite. On three occasions the Rev. J. L. Zabriskie bred examples from nests of *Ceratina dupla* in stems of sumac at different localities in New York State. Howard found also in the Museum of Comparative Zoölogy at Cambridge specimens presumably bred by Mr. H. G. Hubbard from larvæ found in burrows of a small blue bee at Fresh Pond in Cambridge, and further specimens in the Cornell University collection bred from a bee supposed to be *Ceratina dupla*. There can be no doubt therefore, that *A. zabriskei* attacks *Ceratina* and it is very probable that the other members of the genus parasitize small bees of some kind.

Professor Bailey obtained also a single larva and pupa of *Conoaxima*. The larva probably full-grown is of quite unique form, due to the presence of a dorsal series of large, unpaired tubercles. The first of these is on the metathorax and each of the four following segments bears another one; those of the abdomen are larger than the metathoracic one and of about equal size. From the wrinkled appearance of the thin integument that covers the tubercles, it seems evident they are capable of considerable distension during life. After preservation in alcohol, the larger tubercles project for a distance of about one fourth the dorso-ventral thickness of the body and are more than half the width of the body segments to which they are attached. Following these there is a much smaller projection at the tip of the sixth segment and a minute one at the tip of the seventh. From the position of the head and the curvature

<sup>1</sup>Insect Life, vol. 2, pp. 365-367, 3 figs. "A North American *Axima* and its Habits" (1890)

of the body it is clearly evident that these appendages are dorsal and not ventral as one might naturally suppose from analogy with other insect larvæ. Laterally nine small circular spiracles form a continuous series from the mesothorax to the seventh abdominal segment. Scattered over the body are a number of very minute spiniform black tubercles from the apex of some of which there projects a hyaline seta. Most likely all the spines bear setæ in perfect specimens; they are arranged as follows: prothorax with a transverse ring of twelve; meso and meta-thorax with a ring of ten, interrupted above; first abdominal segment with one above the spiracle and a series of three below; second to sixth with one above and two below; seventh and eighth with only two on each side although the eighth bears several other round chitinized dots; apical segment with a ring of about ten. In addition the head bears a seta, without tubercle, at each side of the front and one on each cheek.

The pupa is similar in general form to the imago and the body, including the head, bears a few scattered long bristly hairs. It is nowhere noticeably tuberculate except that behind each antenna there is a lanceolate projection that represents in exaggerated form the carina behind the eye of the adult. Above, the head is bilobed, due to a deep median impression, but the surface of each lobe is evenly convex and shows no trace of the spiniform porcesses of the imago. The anterior margin of the pronotum has a median tubercle which is crowned at apex with a tuft of sparse, short bristly hairs. This no doubt is a functional pupal organ, the vestige of which persists in the imago as the median pronotal projection or tooth described on a previous page. Seven pairs of abdominal spiracles are visible, each deeply pigmented, entering the tracheal trunks by more weakly pigmented funnels.

So far as I can ascertain, the only reference to any larva similar to the one just described, relates to *Axima* which is said by Howard (*loc. cit.*) to have "six or more strong dorsal tubercles." According to the same author the pupa of *Axima* has the head strongly tuberculate which is not the case in *Conoaxima*, except for the lamelliform projections on the temples.